

MEXICAN SPECIES OF *PEDICULARIS* (SCROPHULARIACEAE) HITHERTO CONFUSED WITH *P. TRIPINNATA* MART. & GAL.

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The large circumboreal genus *Pedicularis* (Scrophulariaceae) is represented in Mexico by comparatively very few species. As late as the publication of Hemsley's treatment in the *Biologia Centrali-Americana* (Bot. 2: 467. 1882) only four distinctively Mexican species were listed, viz. *P. angustifolia* Benth., *P. mexicana* Zuccar., *P. orizabae* Cham. & Schlecht., and *P. tripinnata* Mart. & Gal. These were traditionally separated by characters of leaves and flowers, more or less as follows:

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| 1. Leaves linear, undivided. | <i>P. angustifolia</i> |
| 1. Leaves pinnately parted. | |
| 2. Leaves 1-pinnate, the segments incised-dentate. | <i>P. mexicana</i> , <i>P. orizabae</i> |
| 2. Leaves 2-3-pinnate. | <i>P. tripinnata</i> |

The degree to which leaves are dissected varies considerably from plant to plant in these and other species of *Pedicularis*, and so the distinction between "pinnately parted" leaves and "2-3-pinnate" leaves is not always an easy one. As a result, the name *Pedicularis tripinnata* has been loosely applied on occasion to various sterile or fruiting specimens having relatively finely cut leaves. In the protologue of *P. tripinnata*, the corolla was described as "pollicaris rubro-purpurea," with "galea obtusa truncata sub apice 2-4-dentata." Unfortunately no flowering material was available to Bentham when he was preparing the treatment of the genus for the DeCandolle *Prodromus*; he saw in Hooker's herbarium a specimen of the type-number (*Galeotti 1063*), but without flowers. He was therefore uncertain of the identity of the species and, in fact, did not mention it in the *Prodromus*, merely citing the Galeotti specimen as perhaps different from *P. mexicana*. Very probably he did not know of the publication of *P. tripinnata* (1845) before the printing of his *Prodromus* manuscript, which was published 8 April 1846. As far as we know, no other collector obtained identifiable specimens of *P. tripinnata*, after the original collection by Galeotti before 1840, until the plant was found by C. G. Pringle near Pátzcuaro, Michoacán, in 1892. We have recently had the favor of the loan of two isotypes, duplicates of *Galeotti 1063*, the one from Kew (K) already mentioned, and another, a flowering specimen, from Paris (P). There can be no doubt that Pringle's no. 4156 represents the same species; it is, in fact, a rather common plant in western Mexico. It transpires, however, that in the same region there are three distinctive taxa belonging to the same genus, all with dissected and sometimes 2-3-pinnate leaves.

Beginning about 1934, with the explorations of F. W. Pennell, and in 1939 with those of G. B. Hinton, specimens of another *Pedicularis* with dissected leaves have been found at various localities in the mountainous regions from Durango to Michoacán. Pennell tentatively called his specimen "*Pedicularis tripinnata*," and subsequent collectors have accepted this determination to a considerable extent, but Pennell's plant, and that of Hinton, have proved to represent an undescribed species that we are calling *Pedicularis glabra*. In spite of some superficial resemblances between the leaves of *P.*

glabra and those of *P. tripinnata*, the two are not closely related within the genus. *P. glabra* belongs to the very small but distinct Sect. *Longirostres* Benth. (*in* DC. Prodr. 10: 566. 1846), sometimes treated as a distinct genus, *Elephantella* Rydb. In contrast, *P. tripinnata* and the other new species described below are apparently most similar to a small group of American species (*e.g.* *P. densiflora* Benth., of California) having the corolla essentially straight, clavate, without any appreciable curving or lateral extension of the galea at the tip.

A revised key to the Mexican species of *Pedicularis* with pinnately parted or dissected leaves may be presented as follows:

1. Plants glabrous or essentially so; galea prolonged into a curved beak, or at least curved and enlarged into a distinct point on the lower (abaxial) side.
 2. Galea prolonged into a linear, recurved-ascending beak 5–7 mm long; lower lip inconspicuous, more or less clasping the base of the galea, its lateral divisions only 1.5–2.5 mm wide; leaves often 2–3-pinnately parted. *P. glabra*
 2. Galea abruptly or gradually downwardly curved, short-beaked or merely enlarged and pointed on the lower side; lower lip broad, spreading or at most loosely enveloping the galea, its lateral divisions 3–8 mm wide; leaves commonly once pinnately parted, with short-toothed segments.
 3. Lobes of the lower lip 7–8 mm wide, often as long as the galea; galea abruptly incurved nearly at a right angle, narrowed beyond the curve into a short truncate beak. *P. mexicana*
 3. Lobes of the lower lip 3–4 mm wide, much shorter than the galea; galea smoothly incurved from the adaxial side, the beak obsolete, scarcely prolonged beyond the curve. *P. orizabae*
1. Plants evidently pilose; galea clavate, rounded at apex, neither beaked, curved nor enlarged to a point at one side.
 4. Leaves almost all basal; plants 10–30(–60) cm high; calyx 6–8 mm long; corolla about 2.5 cm long; roots tuberous-thickened; flowering June and July; Edo. de México to Jalisco. *P. tripinnata*
 4. Leaves cauline, extending to the base of the inflorescence; plants more than 1 m high; calyx 11–16 mm long; corolla 4–4.5 cm long; roots unknown; flowering and fruiting in November; Sierra Madre del Sur, Guerrero. *P. hintonii*

1. *Pedicularis glabra* McVaugh et Mellichamp, sp. nov.

Herba perennis 10–75 cm alta, glabra, caulibus 1–3 erectis simplicibus; folia principalia basalia, (4–)8–20(–27) cm longa, 0.5–5 cm lata, lanceolata vel oblanceolata, bipinnata, pinnulis saepe dentatis; pinnis (8–)15–25, inferioribus in petiolum interdum subalatum 1–7 cm longum interdum ad basin pilosum valde reductis; pinnulorum margines saepe revolutae et calloso-dentatae; folia caulinea saepe 1–3(–4), quam basalia multo minora; racemi laxi, plerumque 15–25(–40) cm longi, 15–30(–60)-flori; pedicelli 3–5 mm longi, erecti vel valde ascendentes; racemi bractee ascendentes, tripartitae, 8–20 mm longae, lobis calloso-dentatis, lateralibus quam terminali brevioribus; flores 2.5–3 cm longi, calyce campanulato vel ellipsoidali, 5-lobato, tubo (5–)6.5–7.5 mm longo, lobis valde inaequalibus triangularibus acutis, lateralibus unitis (0.8–)1.2–1.5(–1.7) mm longis, lobo dorsali (adaxiali) paullo longiore, marginibus omnis ciliis aggregatis dentes simulantibus instructis; corolla purpureo-rosea (galea atropurpurea, lobi laterales flavi), recurva, bilabiata; labium inferius (abaxiale) 3–6 mm longum, trilobatum, sessile, lobo terminale suborbiculari, (2–)3–4 mm longo latoque, lobis lateralibus suborbicularibus vel quam longioribus latioribus, 2–3.5 mm latis, galeae basi arcte oriundis; labium superius (galea) 9–11 mm longum, supra basin e latere superiore in tubum sublineare recurvo-ascendens truncatum 5–5.7 mm longum abrupte angustatum; stamina 4 didynama inclusa, antheris 2 mm longis; stylus arcuatus, stigmatibus ad anthesin vix e galeae apice exserto; capsula 13.5–20 mm longa, e basi ad apicem brevirostratum angustata; semina plurima, ovato-compressa, nigrescentia, 2 mm longa, laevia, superficie reticulata.

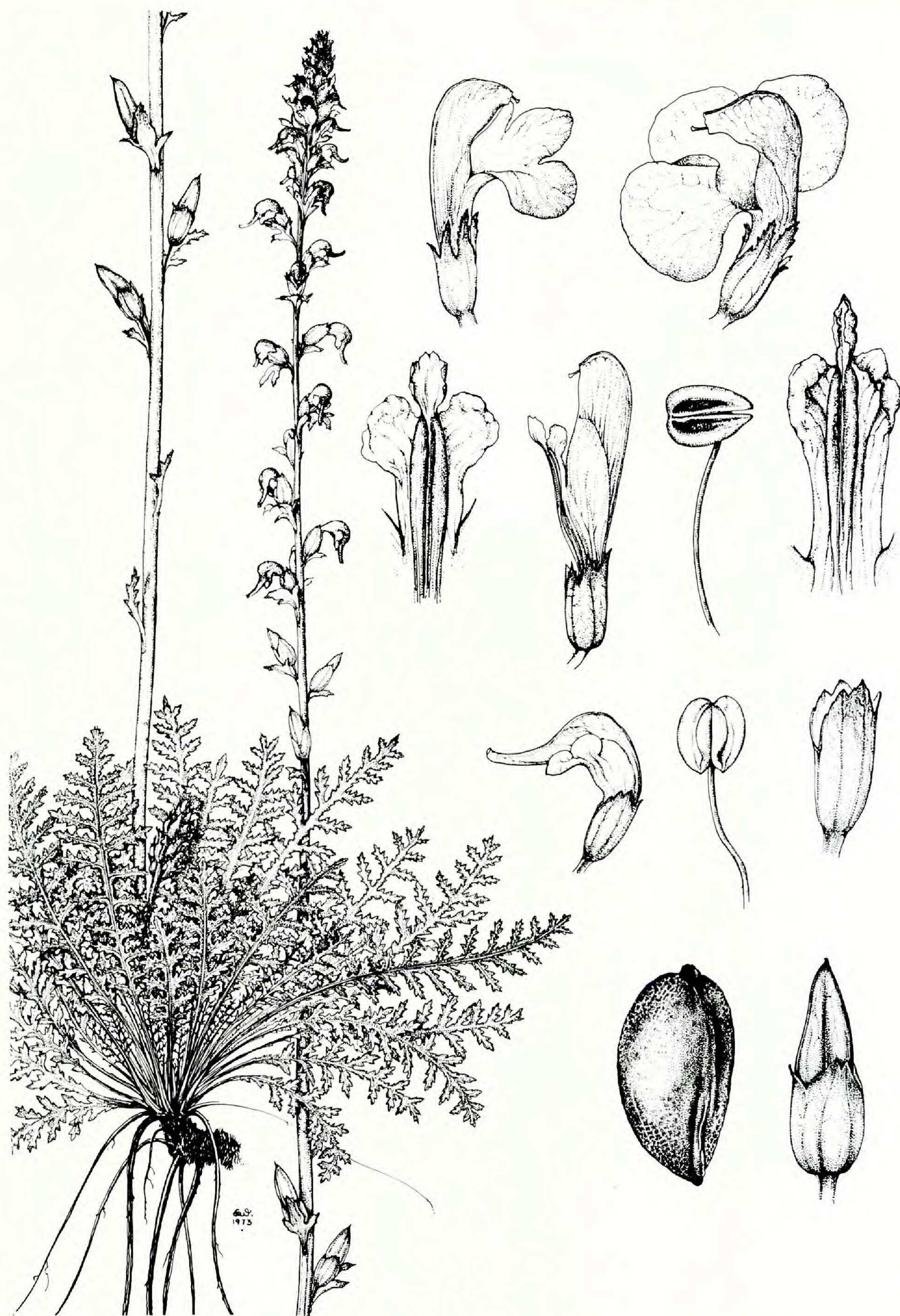


FIG. 1. Mexican species of *Pedicularis*. *P. glabra* (all from the TYPE): Flowering plant at left, $\times\frac{1}{2}$; floral details, two rows from bottom (lateral view of flower, $\times 1.5$; anther, $\times 5$; lateral view of calyx, $\times 2.5$; seed, $\times 15$; lateral view of capsule and fruiting calyx, $\times 1.5$). *P. orizabae* (top row, left, from Pringle 4757): Lateral view of flower, the position of the lower lip diagrammatic, $\times 1.5$. *P. mexicana* (top row, right, from Pringle 4197): Lateral view of flower, the position of the lower lip diagrammatic, $\times 1.5$. *P. tripinnata* (second row, left, from González 219): Lower lip of corolla, $\times 5$; lateral view of flower, $\times 1.5$; anther, $\times 5$. *P. hintonii* (second row, far right, from the TYPE): Lower lip of corolla, $\times 5$. (All drawings by Karin Douthit.)

This plant bears a striking resemblance to the widespread boreal species, *Pedicularis groenlandica* Retz. It is also evidently closely akin to a species of the high Andes of Colombia and Ecuador, *P. incurva* Benth. From these it may be separated as follows:

1. Flowers sessile; calyx 4–7 mm long; beak of the galea longer than the expanded part of the corolla; capsule ovoid, about 1 cm long; widespread in boreal America. *P. groenlandica*
1. Pedicels mostly (3–)5–7 mm long, strongly appressed; calyx 7–14 mm long; beak of the galea shorter than the expanded part of the corolla; capsule elongate, 16–25 mm long; western Mexico, northern Andes.
2. Pressed corolla 5–7 mm wide at the base of the lower lip; beak 5–7.5 mm long; calyx 7–9 mm long, the teeth entire or sometimes callose-toothed; capsule 1.6–1.8 cm long; leaves 2–5 cm wide, 8–25 cm long; Mexico. *P. glabra*
2. Pressed corolla 3–4 mm wide at the base of the lower lip; beak 4–5.5 mm long; calyx 10–14 mm long, the teeth commonly coarsely callose-dentate; capsule (1.8–) 2–2.5 cm long; leaves 1.2 cm wide or less, 10–20 cm long; northern Andes. *P. incurva*

The usual habitat of *Pedicularis glabra* is in pine or pine-oak forest, on moist slopes or near streams, or not infrequently in drier, rocky, or open situations, at elevations from about 2000 m to 2800 m. Flowering begins from late August to mid-October and continues well into November.

Specimens of *P. glabra* examined: MEXICO: DURANGO: Metates, N of Cueva, *Pennell 18444* (F, MICH, US); 10–12 km W of La Ciudad, *Breedlove 15513* (MICH), *18876* (MICH); 10 mi (16 km) W of El Salto, *Straw & Gregory 1269* (MICH), *McVaugh 21746* (MICH); 20 km S of El Salto, *A. G. Gordon 61* (MICH). JALISCO: Sierra de la Campana, NW of Los Volcanes, *McVaugh 13797* (MICH); Sierra de Manantlán, between El Chante and Cuzalapa, near Aserradero El Cuartón, *McVaugh 13834* (MICH, type). MICHOACÁN: Distr. Coalcomán, Barroloso, *Hinton 15370* (MICH, US).

2. *Pedicularis mexicana* Zuccar. ex Benth. in DC. Prodr. 10: 575. 1846.

Superficially similar, in habit and in leaf-characters, to *P. glabra*, but readily distinguished by the very different flowers. *P. mexicana* is a plant of relatively wetter habitats than those of *P. glabra*, as indicated by collectors' notes: "en lugar pantanoso," "pradera pantanosa," "meadow wet with seepage," "wet roadside ditch," "bogs," "wet meadows," "bog area at upper end of lake," "moist grassy hollow," "in a pond," "soggy llano by stream," "sedgy marsh," "mountain springs," etc. In the highlands of western Durango the two species grow in the same general localities, but in different microhabitats; e.g. about 10 miles (16 km) west of El Salto *P. glabra* is "locally abundant in dry, grazed pine woodlands" (*McVaugh 21746*), whereas *P. mexicana*, collected the same day (*McVaugh 21742*) is "abundant in moist meadows in full sun." *P. mexicana* occurs at moderately high elevations (2100–3300 m), commonly begins to flower in July or August, and matures fruit by late August or September. We have seen specimens from western Durango (8), Michoacán (6, including the lectotype, from Anganguero, *Hartweg 355* at K; and from as far west as Pátzcuaro, *Straw & Gregory 1205*, at MICH), Edo. de México (8), D.F. (2), Hidalgo (1), Puebla (1), Tlaxcala (1).

3. *Pedicularis orizabae* Cham. & Schlecht. Linnaea 5: 103. 1830.

This plant is easily confused with *P. mexicana*, from which it differs in measurable flower-characters. It occupies a much more limited range than *P. mexicana* and is found mostly at somewhat higher elevations (3000–3600 m, sometimes as low as 2500 m). It appears to be confined to openings in high pine forests, often among bunch-grasses. We have seen specimens from the Distrito Federal (5, mostly from the

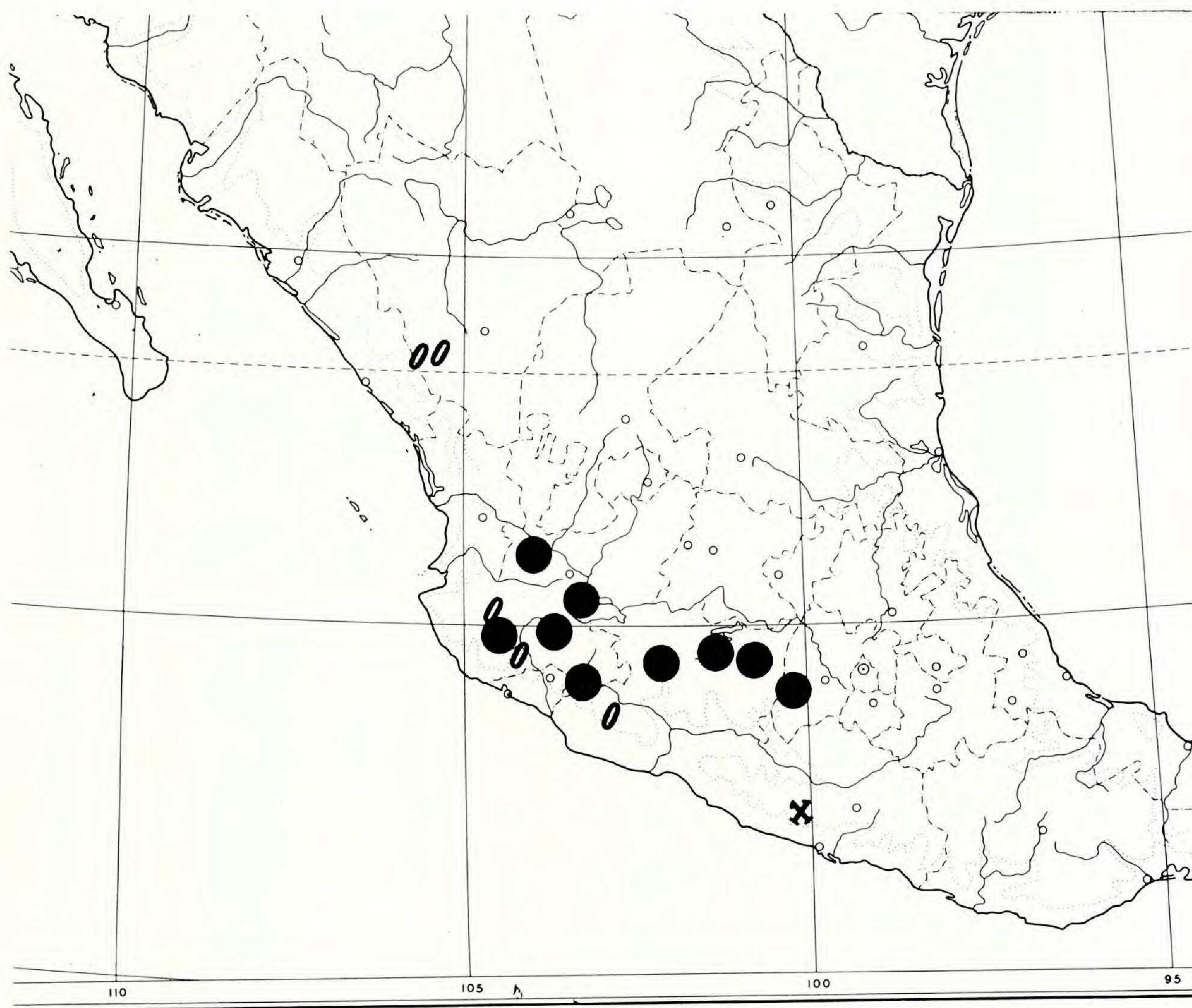


FIG. 2. Distribution of selected Mexican species of *Pedicularis*. Solid circles, *P. tripinnata*. Open ellipses, *P. glabra*. Crossed lines, *P. hintonii*.

Serranía del Ajusco), Veracruz (Pic d'Orizaba [Cueva de Temascal] at 12,000 feet, *Galeotti 1064* at BR, P), and Oaxaca (Cerro, or Sierra, San Felipe, *Andrieux 157* at P, *Pringle 4757* at BR; cordillera E of Oaxaca, *Galeotti 1065* at BR, P).

4. *Pedicularis tripinnata* Mart. & Gal. Bull. Acad. Brux. 12, pt. 2: 34. 1845.

Perennial herbs 20–50 cm tall, with 1–3 stems 2–3(–5) mm thick, from a thickened caudex bearing fusiform, tuberous-thickened roots; plants pilose, especially the lower stem, petioles, and calyces, with whitish flaccid jointed hairs up to 1–1.5 mm long; principal leaves basal, at flowering time (5–)8–15 cm long including a slender petiole 2–10 cm long; rosette leaves after flowering often larger, commonly with blade 12–20 cm long, 7–15 cm wide, on petioles 8–12(–23) cm long; blades 2–3-pinnately divided, pilose especially along the veins beneath, ovate in outline, the lowermost 1–2 pairs of pinnae a little shorter than the upper ones; pinnae at least once-pinnate, the pinnules commonly pinnately incised-dentate; margins commonly revolute, the teeth often callose, whitened; racemes 10–20(–40) cm long, up to 50–75-flowered; bracts foliaceous, 1–2 cm long, oblong to lanceolate or linear, toothed, spreading to reflexed in age; pedicels 3–4 mm long, appressed-ascending; bracteal leaves below the inflorescence sometimes 1–3, rarely a third the size of the basal leaves; flowers about 2.5 cm long; calyx 5-lobed, the tube 4–5.5(–6) mm long, the lobes entire or remotely toothed, (1.5–)2–2.6(–3) mm long, subequal or the dorsal (adaxial) smaller; corolla red, clavate, glabrous, the galea 6–8 mm long, rounded

at apex, the abaxial margins free, straight, the lateral vein on each side sigmoidally curved near the middle of the galea and often ending in a minute tooth at the margin; lower lip erect, 4–5.5 mm long, slightly divergent from the galea, longitudinally plicate with 2 parallel ridges within, trilobate at apex, the lateral lobes suborbicular, ciliolate, 1.5–2 mm wide, the terminal lobe conduplicate, 1.5–2 mm long; anthers 2.5 mm long, crowded into the closed end of the galea; style following the curve of the upper (adaxial) side of the galea, the tip thus recurved, exserted; capsule 11–20 mm long, narrowly ovoid, abruptly apiculate; mature seeds unknown.

In oak or oak-pine forest, in moderately dry places in partial shade, 1500–2800 m elevation, flowering from mid-June to late July, maturing fruit from late July to early September.

Specimens examined: MEXICO: JALISCO: Mpio. Tequila, Cerro de Tequila, *McVaugh 23912* (MICH), *R. González T. 219* (MICH); Sierra de la Campana, W of Los Volcanes, *McVaugh 20042* (MICH); above Amacueca, toward Tapalpa, *McVaugh 20667* (MICH); above San Juan Cozalá, *Puga s.n.* (MICH); Santa Mónica, *McVaugh 14125* (MICH); San Miguel de la Sierra, *McVaugh 22070* (MICH); Sierra del Halo, *McVaugh & Koelz 1171* (MICH). MICHOACÁN: Pátzcuaro, *Pringle 4156* (BR, F, P, US); near Morelia, *Galeotti 1063* (K, P, isotypes); km 234, 10 km E of Mil Cumbres, *Iltis et al. 342* (MICH). MEXICO: Distr. Temascaltepec; Comunidad, *Hinton 965* (US), Nanchititla, *Hinton 6166* (US), Tenayac, *Hinton 4218* (US). LOCALITY UNCERTAIN: "Val. Mexic.," *Keck [exsicc.] no. 7, ex herb. C. Mohr [anno 1857?]* (US).

We were informed by the authorities at Brussels (BR) that no specimen of *Galeotti 1063* could be located there. A suitable lectotype would be the specimen at Paris; the Kew specimen is without flowers.

5. *Pedicularis hintonii* McVaugh et Mellichamp, sp. nov.

Herba perennis simplex 85–110 cm alta, caule basi usque ad 1 cm crasso; radices ignotae; caulis pars inferior, foliorum bases petiolique, et calyces, pilis flaccidis articulatis infuscatis 2–3 mm longis grosse pilosi; folia, praecipue venis majoribus, pilis pallidioribus tenuioribusque instructa; folia ut videtur caulinea et uniformiter disposita, mediana petiolo compresso usque ad 5 cm longo incluso 15–25 cm longa, basi dilatata; laminae 2–3-pinnati-partitae, 5–8 cm latae, ambitu ovatae vel ovato-lanceolatae, pinnis inferioribus paullo minoribus; pinnae utrinque 10–15, lanceolatae, majores basi 2 cm latae, pinnulis inciso-dentatis 5–10 paribus; margines plerumque revolutae, dentibus saepe callosis, dealbatis; bractee foliaceae, conspicuae, calyces excedentes; inferiores usque ad 10 cm longae, 3 cm latae, in folia caulinea transientes, superiores angustae, inciso-dentatae, 2–3 cm longae; pedicelli glabri, 3 mm longi (fructu 5–6 mm longi), valde appressi vel ascendentes; flores 4–4.8 cm longi; calyx 5-lobatus, 11–16 mm longus, lobis subaequalibus 4–8 mm longis, triangularibus, grosse dentatis; corolla rubra, ca 4.5 cm longa, clavata, glabra, galea 15–17 mm longa, apice rotundata, marginibus abaxialibus rectis, libris, pilis brevibus subglandularibus prope basin instructis, venis lateralibus supra marginum medium in curvamen sigmoidalem terminantibus; labium inferius ca 1 cm longum, longitudinaliter plicatum, e latere ut videtur sublineare, marginibus plusminusve ad porcas duas angustas parallelas contiguas in corollae faucem prolongatas appressis; labium apice trilobatum, lobis lateralibus patentibus denticulatis 1.5 mm longis, terminali paullo longiore incurvato, conduplicato; antherae 3.5 mm longae, in galeae apicem clausum aggregatae; stylus per galeae marginem adaxialem appressus, apice hinc recurvatus, exsertus; capsula (22–)27–29 mm longa, anguste ovoidea, abrupte apiculata; semina matura ignota.

Known only from the Sierra Madre del Sur, Guerrero, Mexico: Distr. Mina, Teotepec, 3200 m, among rocks in pine and fir forest, with flower and young fruit 5 Nov. 1939, *Hinton 14789* (US, type; F).

The relationship of *Pedicularis hintonii* is evidently with *P. tripinnata*; the two are in fact so similar that we at first thought to treat them as subordinate taxa of a single species. Because of the marked differences in size, in pubescence, in leaf-arrangement, leaf-dissection, and geographical ranges of the two, we believe they are best regarded as distinct species, realizing that when *P. hintonii* becomes better known it may prove to be more closely related to *P. tripinnata* than is now apparent.

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